We claim:

1. A polarization scrambler apparatus for use in at least one of N nodes of an optical communication system for transmitting optical signals using forward error correction, comprising:

M polarization controllers; and

drive circuitry adapted to drive the M polarization controllers at at least one of a plurality of frequencies $f_{1...}f_M$ wherein:

$f_1 \geq f_2 \ldots \geq f_M$

$f_1 \geq$ about BR / (BECL x N); and

wherein BR is the highest bit rate of the optical signal, and BECL is a maximum burst error correction length of forward error correction used in the optical communication system.

2. The apparatus of claim 1 wherein $f_1 \leq$ about BR/ (ID x 8), where ID is the interleaving depth of the forward error correction used in the optical communication system.

3. The apparatus of claim 1 wherein at least two of the plurality of frequencies $f_{1...}f_M$ are not equal.

4. The apparatus of claim 3 wherein the at least two different frequencies are relatively prime.

5. The apparatus of claim 1 wherein the polarization controller comprises a waveplate.

6. The apparatus of claim 5 wherein the waveplate has fixed slow and fast axes.

7. The apparatus of claim 6 wherein the polarization controller is driven using a frequency such that the difference between the optical phases of the two principle states of polarization of the waveplate is varied between about zero and about π.

8. The apparatus of claim 5 wherein the waveplate has rotatable slow and fast axes such that the orientation of the axes can be controlled.

9. The apparatus of claim 8 wherein the rotation of the slow and fast axes are controlled using a drive signal.

10. The apparatus of claim 8 wherein the slow and fast axes are rotated by greater than about 90°.

11. The apparatus of claim 5 wherein the waveplate has rotatable slow and fast axes and adjustable phase delay between the two principle states of polarization of the waveplate.

12. The apparatus of claim 11 wherein the rotation of the slow and fast axes are controlled using a drive signal.

13. The apparatus of claim 11 wherein the waveplate is driven using a frequency such that the difference between the optical phases of the two principle states of polarization of the waveplate is varied between about zero and about π.

14. The apparatus of claim 12 wherein the slow and fast axes are rotated by greater than about 90°.

15. The apparatus of claim 1 wherein the drive circuitry generates one or more substantially sinusoidal drive signals at one ore more of the plurality of frequencies f_1 -

f_M, to drive the M polarization controllers.

16. An optical communications method for use in at least one of N nodes of an optical communication system using forward error correction to transmit optical signals comprising:

driving M polarization controllers at at least one of a plurality of frequencies f_1 - f_M such that:

$f_1 \geq f_2 \ldots \geq f_M$; and

$f_1 \geq$ about BR / (BECL x N); and

wherein BR is the highest bit rate of the optical signal, and BECL is a maximum burst error correction length of forward error correction used in the optical communication system.

17. The method of claim 16 wherein $f_1 \leq$ about BR/ (ID x 8), where ID is the interleaving depth of the forward error correction used in the optical communication system.

18. The method of claim 16 wherein at least two of the plurality of frequencies $f_1 \ldots f_M$ are not equal.

19. The method of claim 18 wherein the at least two frequencies are relatively prime.

20. The method of claim 16 wherein the polarization controller comprises a waveplate.

21. The method of claim 20 wherein the waveplate has fixed slow and fast axes.

22. The method of claim 21 wherein the polarization controller is driven using a frequency such that the difference between the optical phases of the two principle states of polarization of the waveplate is varied between about zero and about π.

23. The method of claim 20 wherein the waveplate has rotatable slow and fast axes such that the orientation of the axes can be controlled.

24. The method of claim 23 wherein the rotation of the slow and fast axes are controlled using a drive signal.

25. The method of claim 23 wherein the slow and fast axes are rotated by greater than about 90°.

26. The method of claim 20 wherein the waveplate has rotatable slow and fast axes and adjustable phase delay between the two principle states of polarization of the waveplate.

27. The method claim 26 wherein the rotation of the slow and fast axes are controlled using a drive signal.

28. The method of claim 26 wherein the waveplate is driven using a frequency such that the difference between the optical phases of the two principle states of polarization of the waveplate is varied between about zero and about π.

29. The method of claim 26 wherein the slow and fast axes are rotated by greater than about 90°.

30. An optical communication system for transmitting optical signals using forward error correction, comprising:

a plurality of polarization scrambler modules distributed among a plurality of N

nodes of the optical communication system, the polarization scrambler modules including:

M polarization controllers; and

drive circuitry for generating drive signals having frequencies f_1 - f_M to drive the M polarization controllers wherein:

$f_1 \geq f_2 \ldots \geq f_M$;

$f_1 \geq$ about BR / (BECL x N); and

wherein BR is the highest bit rate of the optical signal, and BECL is a maximum burst error correction length of forward error correction used in the optical communication system.

31. An apparatus for polarization scrambling at one or more of N nodes of an optical communication system using forward error correction, comprising:

a plurality of M polarization controller means; and

means for driving the polarization controller means at a plurality of frequencies f_1 - f_M such that:

$f_1 \geq f_2 \ldots \geq f_M$; and

$f_1 \geq$ about BR / (BECL x N); and

wherein BR is the highest bit rate of the optical signal, and BECL is a maximum burst error correction length of forward error correction used in the optical communication system.